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The New Automotive Age: Electric Vehicles and Real-Life Implications for the Automotive Industry

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Electric vehicles (EVs) have become a hot topic due to increased consumer adoption and a global focus on Net Zero carbon emissions by 2050. Rising gas costs and lower EV prices have made consumers view EVs as more affordable. EVs also are becoming more practical and feasible due to technology and infrastructure advancements, including greater driving ranges on a single charge and more availability of charging stations.

Incentives for Purchase and Production

In the United States, this EV trend has been emphasized by the Biden Administration's administrative actions, which heavily incentivize the purchasing and manufacturing of EVs. The Biden Administration has a goal of hitting a 50% EV target of sales share in the U.S. by 2030. The first major step towards achieving this goal can be found in several provisions of the Inflation Reduction Act (IRA). Consumers, specifically, can take up to a $7,500 credit on a purchase of a “clean vehicle.”

Further, state governments are promoting regulations targeted at speeding up the production of EVs. Notably, the California Air Resources Board unanimously adopted a resolution that bans the sale of gas-powered vehicles in the state by 2035. Some states have already followed California’s zero emission goal, including Maryland, Massachusetts, New Jersey, New York, Oregon, and Washington. But there is also some resistance. In October 2022, the North Carolina Governor issued an Executive Order requiring manufacturers of medium and heavy-duty vehicles to make an increasing percentage of their North Carolina fleets electric beginning in 2025. In October 2023, however, the NC Legislature blocked this program by prohibiting the adoption of the implementing regulations.

An increased consumer demand for EVs also comes with an increased demand placed on manufacturers. The IRA also provides incentives applicable to manufacturers. These include the 48C Credit[1], which the IRA expanded to include property that re-equips an industrial manufacturing facility with equipment designed to reduce greenhouse gas emissions by at least 20% or that re-equips, expands, or establishes an industrial facility for the processing, refining, or recycling of critical materials. Additionally, manufacturers that produce “eligible components,” which includes applicable critical minerals, are eligible for the Advanced Manufacturing Production Credit.[2]

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Manufacturers certainly are stepping up to meet the growing demand for EVs. In October 2023, Toyota announced an additional $8 billion investment in its Liberty, N.C. location to support EV battery production. The additional investment brings Toyota’s total investment in the EV battery production facility to $13.9 billion—and the plant is expected to create 5,000 jobs.[3] Additionally, Hyundai is delivering a $5.5 billion EV plant in Savannah, Ga. that is expected to employ 8,100 across its electric vehicle assembly and EV battery facilities on the campus. The project is considered the largest economic development project in state history.[4] Similar projects are sprouting up all around the country, a testament to the great demand for EVs—and this presents tremendous economic development and job creation opportunities.

Electric Vehicle Materials for Manufacturing

Many aspects of the EV manufacturing process are similar to the process for combustion engine vehicles, such as body assembly, paint shop, general assembly, and quality control; however, some of the most significant differences include specialized component manufacturing and finishing and the manufacturing of EV batteries.

EV batteries are made of several “critical materials,” as defined by the Department of Energy.[5] Specifically, EV batteries typically include lithium, manganese, cobalt, graphite, steel, and nickel. Each is used for a particular purpose. Lithium-ion offers high energy densities, which helps with increased storage capacity and reduction of size of batteries. Manganese operates as a stabilizing component; cobalt helps to extend the life of EV batteries; and graphite helps increase EV batteries' stability and energy densities (similar to lithium-ion). Finally, nickel helps resist corrosion and increases energy density (similar to lithium-ion and graphite).

To harness these critical materials to manufacture EV batteries, the chemical components must be extracted through mining. This reliance on mining creates its own series of risks and challenges for manufacturers in the EV sector.

Mining Implications + ESG Concerns

Corporate Environmental, Social, and Governance (ESG) provides a framework that prioritizes transparency and reporting regarding matters that reveal a company's environmental, societal, and governance positions. Environmental considerations under an ESG framework address the impact on the physical environment and risk from climate events (*e.g.*, climate change, pollution, etc.). Social considerations under an ESG framework address the social impact on the community in which it operates (*e.g.*, labor practices, diversity and inclusion, community engagement, etc.). Governance considerations address the internal decision-making and governance structure (*e.g.*, internal policies, governance structure, supply chain management, data security, etc.).

ESG principles, in some instances, are becoming increasingly significant for businesses because of investor attention to ESG matters. This holds true for EV manufacturers as well. The primary ESG concern for EV manufacturers, and even more so for EV battery manufacturers who must mine for materials, is the environmental impact. Materials mining companies, however, have been providing attention to ESG matters for years. This experience, in turn, helps EV battery manufacturers to be more proactive in the ESG arena when working closely with experienced material mining companies.

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The International Energy Agency (IEA) recently suggested that the genesis of 75% of current greenhouse gas emissions are from the energy sector.[6] This includes the manufacturing of EVs. EV battery manufacturing has several environmental concerns when it comes to the mining of the critical components. For example, the lithium mining process requires large amounts of water. This can impact neighbors' water supply wells and is particularly concerning in areas with a freshwater shortage, as it risks exacerbating the issue. Lithium mining often requires large tracts of land, eliminating forests and farmland, and can contribute to air, soil and water impacts.

Additionally, there have been numerous issues concerning toxic waste from mines in global regions where the mines have been less regulated or where less attention to ESG matters has been provided by the mining companies, and in some instances, this toxic waste has ended up in the community's water, like in China.[7]

Further, EV batteries have current challenges for ultimate recycling and disposal risks.

Looking to the Future

Given the dichotomy of the desire for clean transportation and the risk of causing such negative environmental and societal impacts, automotive companies should look for innovative ways to mitigate negative attributes in associated manufacturing processes.

Some companies have already begun to develop and patent innovative mining technology that reduces freshwater use in the lithium extraction process (such as Standard Lithium Ltd.). Some car manufacturers, such as Nissan, Renault, and Volkswagen, already are implementing the reuse of EV batteries and have established battery recycling plants to help prevent the batteries from ending up in landfills.

Companies also can seek to obtain government incentives for decarbonizing EV manufacturing facilities and automotive production in nations, states/provinces/regions, and local communities where available and when negotiating to build new facilities. By working together, companies and governments can cooperate to achieve mutually desirable goals that incentivize both care for the environment and economic growth.

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[1] https://uscode.house.gov/view.xhtml?req=granuleid:USC-2015-title26-section48C&num=0&edition=2015; *see also* https://www.energy.gov/infrastructure/qualifying-advanced-energy-project-credit-48c-program.

[2] https://uscode.house.gov/view.xhtml?req=granuleid:USC-prelim-title26-section45X&num=0&edition=prelim; *see also* https://www.irs.gov/instructions/i7207.

[3] https://pressroom.toyota.com/toyota-supercharges-north-carolina-battery-plant-with-new-8-billion-investment/

[4] https://www.savannahnow.com/story/business/2023/02/17/hyundai-ev-plant-bryan-county-ga-larger-than-montgomery-alabama/69915046007/

[5] Critical materials for energy include aluminum, cobalt, copper, dysprosium, electrical steel, fluorine, gallium, iridium, lithium, magnesium, natural graphite, neodymium, nickel, platinum, praseodymium, terbium, silicon, and silicon carbide.

[6] https://www.iea.org/reports/net-zero-by-2050 (note that the IEA report, however, does not define “energy sector”).

[7] https://www.scmp.com/business/article/3202402/asias-lithium-capital-grinds-halt-output-battery-material-stops-yichun-amid-pollution-investigation

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